COMPOSITION FOR SCAVENGING ACTIVE OXYGEN, AND METHOD FOR PRODUCING THE SAME

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Abstract of **JP2001299305**

PROBLEM TO BE SOLVED: To provide a composition capable of effectively scavenging active oxygen, and further to provide a method for producing the composition, and an edible composition. SOLUTION: This composition for scavenging the active oxygen contains an extract obtained by using a plant body of Cruciferae plant such as a kale as a raw material, extracting the plant body by using water and/or a hydrophilic organic solvent, more preferably acidic above extracting solvent, more preferably, the one obtained by subjecting the resultant extract to ion-exchange treatment. The edible composition is obtained by formulating the composition.

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(54)【発明の名称】　活性酸素消去用組成物およびその製造法

(57)【要約】
【課題】　活性酸素を効果的に除去し得る組成物、該組成物の製造法及び食用組成物を提供する。
【解決手段】　ケール等のアブラナ科植物の植物体を原料とし、水及び／又は親水性有機溶媒、より望ましくは酸性の前記抽出溶媒を用いて抽出される抽出物、より好ましくは該抽出物をさらにイオン交換処理に供して得られるものを含有せしめてなる活性酸素消去用組成物。また、該組成物を配合してなる食用組成物。

【特許請求の範囲】
【請求項１】　アブラナ科植物の植物体の抽出物を含有してなる活性酸素消去用組成物。
【請求項２】　アブラナ科植物がケール，ハボタン，ブロッコリー及びカリフラワーからなる群から選ばれる１種又は２種以上である請求項１に記載の活性酸素消去用組成物。
【請求項３】　抽出物が水及び／又は親水性有機溶媒を用いて抽出処理して得られる粉末状エキスである請求項１に記載の活性酸素消去用組成物。
【請求項４】　水及び／又は親水性有機溶媒が酸性のものである請求項３に記載の活性酸素消去用組成物。
【請求項５】　抽出物がイオン交換処理を経て精製されたものである請求項１又は３に記載の活性酸素消去用組成物。
【請求項６】　アブラナ科植物の植物体の抽出物と，活性酸素消去能を有する公知の素材とを少なくとも含有してなる活性酸素消去用組成物。
【請求項７】　活性酸素消去能を有する公知の素材が，アスコルビン酸，トコフェロール，カテキン類，アントシアニン類，フラボノイド類，これ以外のポリフェノール類，緑茶エキス，ほうじ茶エキス及びルイボスティーエキスからなる群から選ばれる少なくとも１種である請求項６に記載の活性酸素消去用組成物。
【請求項８】　アブラナ科植物の植物体を水及び／又は親水性有機溶媒を用いて０～１００℃で抽出することを特徴とする活性酸素消去用組成物の製造法。
【請求項９】　ケールの乾燥物の切断物を酸性の水及び／又は親水性有機溶媒を用いて抽出し，該抽出物をイオン交換処理に供することを特徴とする請求項８に記載の活性酸素消去用組成物の製造法。
【請求項１０】　請求項１～７のいずれか１項に記載の活性酸素消去用組成物を配合してなる食用組成物。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は，特定の原材料を用いてなる活性酸素消去用組成物，その製造法及び利用に係るものである。より詳しくは，アブラナ科植物の植物体の水及び／又は親水性有機溶媒による抽出エキスを含有してなる活性酸素消去用組成物に関するものであり，また，該組成物の製造法および利用に関するものである。
【０００２】
【従来の技術】ヒトをはじめとする好気的生物のエネルギーは主に生体内での酸化的リン酸化反応に基づくものであり，その生命維持には大量の酸素を必要とする。ヒト成人では日常生活の維持のために，１日約５００Ｌの酸素を消費している。酸素消費量は，臓器，細胞及び固体の状態により著しく異なるが，生体内に取り込まれた酸素の数％は，常に種々の酵素代謝系によりスーパーオキサイドアニオン，過酸化水素，ヒドロキシラジカル，一重項酸素，アルコキシラジカル等の活性化された酸素（以下，活性酸素という）に変化している。それらの分子種の多くは反応性が高く，生体内で産生された活性酸素は，体内に侵入する微生物等に対して殺菌作用を示し，生体への感染を防いでいる。
【０００３】一方，活性酸素は生体内で脂質，タンパク質，核酸，糖質などを攻撃し，その機能を障害することが知られている。すなわち，ラジカル連鎖反応により，生体機能を障害する反応産物を増加させ，様々な疾病を発症させ，また，病態を悪化させる危険性を有している。例えば，酵素の失活，過酸化脂質の生成，ＤＮＡ鎖の切断，赤血球膜やミトコンドリア膜等の破壊作用が起こり，また，それらの作用により心筋梗塞，動脈硬化，癌，糖尿病，肝臓障害，脳卒中，白内障，肩こり，冷え性，しみ，そばかす，しわ等が生じる。
【０００４】したがって，生命維持には生体内代謝で発生する活性酸素を，効率よく分解処理することが重要である。通常，生物は生体内でスーパーオキシドジスムターゼ，カタラーゼ，グルタチオンペルオキシダーゼ等の酵素により，活性酸素から自己を守る抗酸化防御システムを有している。しかし，ストレスや高齢化等によりそれらの酵素量が減少すると活性酸素が過剰に蓄積され，これにより生体内バランスが崩れ，前述のような病態を発症または悪化させてしまう。そこで，生成された過剰な活性酸素を消去するには，安全で副作用のない食品，食品素材中に含まれる活性酸素消去機能のある物質を補給することが必要となってくる。
【０００５】活性酸素を消去する作用のある物質の探索が従来から行われてきた。例えば，生体内でも生成されるスーパーオキシドジスムターゼがあるが，これは蛋白質であり，経口摂取では消化されたり，注射投与でも血中残存性が低く実用には適さない。また，アスコルビン酸（ビタミンＣ）やトコフェロール（ビタミンＥ）等のいわゆる抗酸化性物質が酸化防止の点から用いられているが，活性酸素消去機能の点ではいずれも効果が小さく，安定性の面でも難点がある。このほか，天然物よりわけ生薬原料から抽出された活性酸素消去成分が提案されており，例えば特開昭６１－２４５２２号，特開平２－１９３９３０号，特開平２－２６４７２７号，特開平３－１５３６２９号，特開平４－６９３４３号，特開平４－２０２１３８号等の各公報に記載の発明がある。しかし，これらは活性酸素を消去する効果の点から十分に満足できるものではなく，実用的ではなかった。
【０００６】一般に，天然物である植物種にはフラボノイド，タンニン，カテキン，ポリフェノール等の成分が含まれており，これらは活性酸素を消去する機能があることが知られている。例えば，ブドウ種子から水や親水性有機溶媒を用いて抽出されるエキスにはポリフェノール類が含まれ，とりわけアントシアニジン，プロアント

シアニジン等が多く含まれており、活性酸素消去能や抗酸化能のある食品素材として市販されている。また、フラボノイドやカテキンがアセトアルデヒドや過酸化水素等の存在下において活性酸素を消去する作用を示すときに微弱な発光現象が認められ、この相関性から活性酸素消去能のある成分や素材を探索しようとする試みがある（Y. Yoshiki et al., Phytochemistry, 39, 225-229 (1995)、同J. Biolumin. Chemilumin., 10, 335-338 (1995)等）。このように活性酸素消去能を有する素材の開発は鋭意検討されているが、これらを商業ベースの製品に応用しても、実際には所望の効果を十分に発現し得るものであるとはいえず、より強力かつ効果的に活性酸素を消去するものが求められていた。

【0007】

【発明が解決しようとする課題】かかる現状に鑑み、本発明では、生体のDNA、細胞、組織等に酸化的損傷や傷害を与え、老化症状や各種疾病をひきおこすと考えられている活性酸素を強力かつ効果的に消去ないしは除去でき、安全性の点で懸念のない活性酸素消去用組成物及びその製造法を提供し、さらには該組成物を配合した食用組成物を提供することを目的とした。

【0008】

【課題を解決するための手段】前記課題の活性酸素消去用組成物は、アブラナ科植物の植物体の抽出物を含有してなる活性酸素消去用組成物によって達成される。ここで、アブラナ科植物としてはケール、ハボタン、ブロッコリー及びカリフラワーからなる群から選ばれる１種又は２種以上のものが望ましく、このうちケールが特に好ましい。また、本発明に係る抽出物は、アブラナ科植物を水及び／又は親水性有機溶媒を用いて抽出処理して得られる粉末状エキスであることが望ましく、前記の抽出溶媒は酸性を呈するものがさらに望ましい。なお、抽出時の温度は0～１００℃、より好ましくは５０～１００℃である。さらには、本発明に係る抽出物は沈殿分離やイオン交換カラム等の処理に供して精製し、とくに陰イオン交換処理を経て精製されたものがより一層望ましい。

【0009】本発明の活性酸素消去用組成物は、また、前記のアブラナ科植物の植物体の抽出物と、活性酸素消去能を有する公知の素材とを少なくとも含有してなる活性酸素消去用組成物によっても達成される。ここで、活性酸素消去能を有する公知の素材として、アスコルビン酸（ビタミンＣ）、トコフェロール（ビタミンＥ）、カテキン類、アントシアニン類、フラボノイド類、これら以外のポリフェノール類、緑茶エキス、ほうじ茶エキス及びルイボスティーエキスからなる群から選ばれる少なくとも１種であることが望ましい。

【0010】前記課題の活性酸素消去用組成物の製造法は、アブラナ科植物の植物体を生のまま又は乾燥させチップ状に切断したものを水及び／又は親水性有機溶媒を用いて０～１００℃で抽出し、該抽出液から溶媒を除去する方法によって達成される。ここで、アブラナ科植物はケールであり、この乾燥物の切断物を原料として用いることが好ましい。また、抽出の溶媒は酸性とし、温度は５０～１００℃、抽出時間は０．５～５０時間であることが望ましい。さらに、より顕著な効果を奏する活性酸素消去用組成物の製造法としては、前述の製造法によって得られた抽出物に対して、沈殿分離やイオン交換処理等の精製処理、より望ましくは陰イオン交換処理を施すことにより達成される。

【0011】さらに、前記課題の食用組成物は、前述のいずれかの活性酸素消去用組成物を配合してなる食用組成物によって達成される。

【0012】

【発明の実施の形態】まず、本発明の活性酸素消去用組成物について以下にさらに詳述する。本発明の活性酸素消去用組成物は、アブラナ科植物の植物体の抽出物を含有してなるものである。

【0013】原料として用いるアブラナ科植物は、具体例としてケール（Brassicaoleracea Var. acephala）（キッチンケール、ツリーケール、ブッシュケール、マローケール、コラード、緑葉カンラン等）、ハボタン、ブロッコリー、カリフラワー、アブラナ、ハクサイ、キャベツ、メキャベツ（コモチカンラン）、小松菜、チンゲンサイ、カラシナ、コールラビ、クレソン（オランダガラシ）、タアサイ、カブ、大根、ワサビ、キョウナ、ガーデンクレス、ロケット、マスタード、ナズナ、ハタザオ、コショウソウ等をあげることができ、これらのうちケール、ハボタン、ブロッコリー及びカリフラワーからなる群から選択される１種又は２種以上を用いることが望ましい。最も望ましいものはケールである。使用する植物体の部位はとくに限定されるものではないが、葉部などの通常食用に供する部分が好ましい。なお、原料形態は生のまま使用してもよいが、より好ましくは乾燥したものを適度な大きさに切断して用いる。

【0014】本発明の活性酸素消去用組成物に係る抽出物は次のようにして得ることができる。すなわち、前記原料に対して３～１５重量倍の水及び／又は親水性有機溶媒を加え、温度０～１００℃、より好ましくは５０～１００℃で０．５～５０時間、１回もしくは繰り返し抽出する。ついで、抽出残渣を沪別や遠心分離により除去して抽出液を得、必要に応じて減圧下で濃縮処理を施し、さらには噴霧乾燥あるいは凍結乾燥等の処理によって水分を除去して活性酸素消去能に優れた粉末状の抽出物を調製する。親水性有機溶媒としては、例えば、メタノール、エタノール、プロパノール、ブタノール、アセトン、アセトニトリル、酢酸、ギ酸等を使用することが

できるが、これらを高濃度のままで使用すると、得られる抽出物の活性酸素消去能は低下する。したがって、前記の親水性有機溶媒を含水させ、メタノールやエタノールの場合は３０容量％以上の含水率、その他の溶媒の場合は、５０容量％以上の含水率にすることが望ましい。また、抽出用溶媒として塩酸、リン酸、酢酸等を用いて酸性状態、すなわちｐＨ７未満、より好ましくはｐＨ６～２にしたものを用いると、活性酸素消去能がより高い抽出物を得ることができる。なお、抽出液から溶媒を除去するにあたっては、本発明に係る抽出物成分は熱に対して比較的安定であり、凍結乾燥処理に限定されるものではない。しかしながら、吸湿による変質や酸化による本発明の所望の効果の低下が起こる可能性があり、空気との接触頻度を可及的に少なくすることが望ましい。

【００１５】本発明の活性酸素消去用組成物の主体をなす抽出物は、前述のようにアブラナ科植物の植物体から抽出して得られるものであるが、これを水などに溶解させ、遠心分離、エタノール沈殿分離、溶剤・分別、シリカゲル、アルミナ、活性炭、活性白土等の吸着剤による分画、イオン交換分離等の精製処理を施すことにより、抽出物の活性酸素消去能をさらに高めることが可能である。とりわけ、前記方法によって得られる抽出物を水溶液等の溶液となし、これをイオン交換処理に供して精製するのがよい。イオン交換処理としては、望ましくは陰イオン交換能を有する樹脂を用いて吸脱着処理させ、活性酸素消去能の高い成分を濃縮することができる。

【００１６】本発明の活性酸素消去用組成物は、前述のようにして得られる抽出物を含有せしめて調製する。すなわち、前記抽出物そのものを本発明の目的物とすることができ、あるいは本発明の所望の作用効果を阻害しない公知の素材成分、賦形剤、増量剤、着香料等の各種添加剤とともに混合もしくは溶解させ、液体状、ペースト状、粉末状、顆粒状又は固形状の活性酸素消去用組成物となすこともできる。この場合、本発明に係る抽出物の配合割合は任意であり、抽出物の活性酸素消去活性、目的とする組成物の形態、併用する素材や成分の種類等により一律に規定しがたいが、利用面での利便性の点から概ね０．１～９９重量％、より好ましくは３０～９０重量％である。

【００１７】前記の併用素材あるいは成分として望ましいものは、活性酸素消去能を有する公知の素材である。この例として、アスコルビン酸（ビタミンＣ）、トコフェロール（ビタミンＥ）、カテキン類（エピガロカテキン、エピガロカテキンガレート、エピカテキン、エピカテキンガレート等）、アントシニン類（デルフィニジン、シアニジン、ペチュニジン、ペオニジン、マルビジン、これらの配糖体等）、フラボノイド類（クエルセチン、ルチン、ケンフェロール、ルテオリン、イソフラボン、これらの配糖体等）、これ以外のポリフェノール類（サポニン、エラグ酸、タンニン等）、緑茶エキス、ほうじ茶エキス、ルイボスティーエキス等からなる群から選ばれる少なくとも１種のものが望ましい。

【００１８】本発明に係る抽出物やこれを含有してなる活性酸素消去用組成物の活性酸素消去能を評価するには次に述べる方法を用いるのが簡便である。すなわち、活性酸素種と活性酸素ラジカル消去物質と活性酸素ラジカル受容種との三種類の物質が共存する系において、活性酸素種と活性酸素ラジカル消去物質とが化学反応して活性酸素が安定化する際に生じる微弱発光現象をフォトン強度として検出する方法（前記の文献参照）や、スーパーオキサイドやヒドロキシラジカル等の活性酸素とＤＭＰＯ（５，５－ジメチル－１－ピロリン－Ｎ－オキサイド）とがオキシダーゼ共存下でＤＭＰＯ－O_2付加体を形成することを利用したＥＳＲスピントラッピング法等がある。

【００１９】本発明では、前述のように、アブラナ科植物の植物体の抽出物を含む活性酸素消去用組成物が提供されるが、さらにこれを配合してなる組成物も提供される。この組成物の態様としては食用組成物、医薬用組成物、化粧用組成物、その他の工業用組成物等を例示できる。これらのうち、食用組成物が好適である。以下に前記各組成物の例を示すが、本発明はこれらに限定されるものではない。

【００２０】食用組成物としては、本発明の活性酸素消去用組成物をそのまま液状、ゲル状あるいは固形状の食品、例えば清涼飲料、ジュース、茶、ドレッシング、ソース、味噌、醤油、スープ、ゼリー、プリン、ヨーグルト、チョコレート、ふりかけ、ガム、キャンディー、ケーキミックス、スナック菓子、粉末状または液体状の乳製品、パン、クッキー等に添加したり、適宜に澱粉、デキストリン、乳糖等の賦形剤や色素、香料等とともに粉末、顆粒、錠剤、内服液等に加工したり、ゼラチン等の被覆材を用いてカプセルに成形加工して健康食品、栄養補助食品や医薬品外品として利用できる。

【００２１】この食用組成物において、本発明の活性酸素消去用組成物の配合量は、当該食用組成物の種類や状態等により一律に規定しがたいが、概ね０．１～５０重量％、より好ましくは１～３０重量％である。配合量が０．１重量％未満では経口摂取による所望の効果が小さく、５０重量％を超えると食用組成物の種類によっては風味を損なったり、当該食用組成物を調製できなくなる場合がある。なお、本発明の活性酸素消去用組成物それ自体は、これをそのまま食用組成物として食用に供してもさしつかえない。

【００２２】前記食用組成物以外には、本発明の活性酸素消去用組成物を粉末状または液体状でクリーム、乳液、口紅、ファンデーション、日焼け止め液等のサンスクリーン製品、シャンプー、リンス等に配合して化粧用組成物となすことができ、また、各種パッキング製品、シール剤、接着剤、塗装剤等に配合して工業用組成物と

しても利用され得る。

【0023】

【実施例】実施例1

生のケールをチップ状に切断し、これに対して5重量倍の水を加え、95℃で1時間抽出処理した後、残渣を沪別して抽出液を得た。ついで、これを凍結乾燥処理することにより黄褐色～褐色の粉末状の抽出物を調製した。この抽出物を本発明の活性酸素消去用組成物（試料1）とした。

【0024】実施例2

生のキャベツを実施例1と同様に処理して本発明の活性酸素消去用組成物（試料2）を調製した。

【0025】実施例3

生のブロッコリー（全体）を実施例1と同様に処理して本発明の活性酸素消去用組成物（試料3）を調製した。

【0026】実施例4

生の大根の葉部を実施例1と同様に処理して本発明の活性酸素消去用組成物（試料4）を調製した。

【0027】実施例5

生状態のハボタンの白色又は紫色のものを実施例1と同様に処理して本発明の活性酸素消去用組成物（試料5－1又は試料5－2）を調製した。

【0028】実施例6

生のケールを乾燥させてチップ状に切断したもの（以下、ケールの乾燥チップという）を原料とし、これに対して10重量倍のアルコール濃度：50容量%の含水エタノールを加え、70℃で1時間抽出処理した後、残渣を沪別して抽出液を得た。ついで、これを減圧下に乾固して緑褐色～褐色の粉末状の抽出物を調製した。この抽出物を本発明の活性酸素消去用組成物（試料6）とした。

【0029】実施例7

ケールの乾燥チップに対して12重量倍のアルコール濃度：70容量%の含水メタノールを加え、65℃で1時間環流させ抽出処理した後、残渣を沪別して抽出液を得た。ついで、これを減圧下に乾固して緑褐色～褐色の粉末状の抽出物を調製した。この抽出物を本発明の活性酸素消去用組成物（試料7）とした。

【0030】実施例8

ケールの乾燥チップに対して12重量倍の水を加え、50℃で1時間抽出処理した後、残渣を沪別して抽出液を得た。ついで、これを凍結乾燥処理することにより黄褐色～褐色の粉末状の抽出物を調製した。この抽出物を本発明の活性酸素消去用組成物（試料8）とした。

【0031】実施例9

ケールの乾燥チップに対して14重量倍の水を加え、70℃で1時間抽出処理した後、残渣を沪別して抽出液を得た。ついで、これを凍結乾燥処理して黄褐色～褐色の粉末状の抽出物を調製した。この抽出物を本発明の活性酸素消去用組成物（試料9）とした。

【0032】実施例10

ケールの乾燥チップに対して13重量倍の水を加え、95℃で3時間抽出処理した後、残渣を沪別して抽出液を得た。ついで、これを凍結乾燥処理して黄褐色～褐色の粉末状の抽出物を調製した。この抽出物を本発明の活性酸素消去用組成物（試料10）とした。

【0033】実施例11

耐圧性容器にケールの乾燥チップを仕込み、該チップに対して12重量倍の水を加え、約2kg／cm²の加圧下125℃で1時間抽出処理した後、残渣を沪別して抽出液を得た。ついで、これを凍結乾燥処理して黄褐色～褐色の粉末状の抽出物を調製した。この抽出物を本発明の活性酸素消去用組成物（試料11）とした。

【0034】実施例12

ケールの乾燥チップに対して12重量倍の水を加え、室温で15時間抽出処理した後、残渣を沪別して抽出液を得た。この残渣に7重量倍の水を加え、同様に室温で15時間抽出ついで残渣沪別を行い抽出液を得た。両抽出液をあわせ凍結乾燥することにより黄褐色～褐色の粉末状の抽出物を調製した。この抽出物を本発明の活性酸素消去用組成物（試料12）とした。

【0035】実施例13

ケールの乾燥チップに対して12重量倍の10重量%酢酸水溶液を加え、70℃で1時間抽出処理した後、残渣を沪別して抽出液を得た。ついで、これを減圧下に乾固して緑褐色～褐色の粉末状の抽出物を調製した。この抽出物を本発明の活性酸素消去用組成物（試料13）とした。

【0036】実施例14

ケールの乾燥チップに対して12重量倍の0.05重量%水酸化ナトリウム水溶液を加え、70℃で1時間抽出処理した後、残渣を沪別して抽出液を得た。ついで、これを減圧下に乾固して緑褐色～褐色の粉末状の抽出物を調製した。この抽出物を本発明の活性酸素消去用組成物（試料14）とした。

【0037】実施例15

試料10をその濃度が40重量%となるように水に溶解させ、室温にて約3時間静置後、生じた沈殿物を遠心分離して除き、上澄液を採取した。ついで、これを凍結乾燥することにより粉末状の精製抽出物を調製した。この精製物を本発明の活性酸素消去用組成物（試料15）とした。

【0038】実施例16

実施例15で得た粉末状の精製抽出物をその濃度が20重量%となるように水に溶解させ、これにアルコール濃度が50重量%となるようにエタノールを加えた後、生じた沈殿物を遠心分離して除去し、上澄液を採取した。ついで、これを凍結乾燥することにより、粉末状の精製抽出物を調製した、この精製物を本発明の活性酸素消去用組成物（試料16）とした。

【００３９】実施例１７
試料１０をその濃度が１０重量％となるように水に溶解させ、予め常法により活性化させた陰イオン交換樹脂（バイオラッド社、ＡＧ１－Ｘ８）を充填したオープンカラム管に注入し、水を移動相として１ｍｌ／分の割合で流した。この操作を３０分間続け、移動相を６重量％酢酸水溶液にきりかえ、吸着成分を溶離させた。この酢酸分画分を凍結乾燥処理することにより粉末状の精製抽出物を調製した。この精製物を本発明の活性酸素消去用組成物（試料１７）とした。
【００４０】実施例１８
市販の緑茶葉を８０℃の熱水で１時間抽出処理し、残渣を分離して緑茶抽出液を得た。ついで、これを噴霧乾燥処理して緑黄褐色の粉末状の緑茶エキスをつくった。この緑茶エキスと、実施例１０に記載の方法により調製した粉末状の抽出物とを２０：８０（重量比）の割合で十分に混合して本発明の活性酸素用組成物（試料１８）とした。
【００４１】実施例１９
本発明の粉末状活性酸素消去用組成物（試料９）１ｋｇに１５重量％還元麦芽糖水飴（マルチトール）水溶液を噴霧し、高速撹拌造粒機（フカエバウレック社製、ハイスピードミキサー）に供して造粒化した後、乾燥及び篩過（１０～８０タイラー・メッシュ）して顆粒状の食用組成物を試作した。これは野菜類特有の青臭さがなく、風味、食感ともに良好であり、体内の活性酸素を消去し、活性酸素の作用によって誘発される各種疾患の予防用食品として好適に利用され得るものである。
【００４２】実施例２０
本発明の粉末状活性酸素消去用組成物（試料１０）２ｇを市販の番茶０．２リットルに添加し、十分に混合して均質な飲料物を試作した。このものは通常の番茶と比較して風味、色あい、食感等の食品適性に遜色なく、活性酸素消去およびこれに関係する種々の疾病の予防のための飲料として利用され得る。
【００４３】比較例１
生のトマトの実を軽くつぶし、これを原料とし、実施例１と同様に処理して粉末状の抽出組成物（比較試料１）を得た。
【００４４】比較例２
生のシソの葉をチップ状に切断し、これを原料とし、実施例１と同様に処理して粉末状の抽出組成物（比較試料２）を得た。
【００４５】比較例３
ケールを原料とした市販の青汁（田辺食品（株）製、乾燥粉末品）を本発明品の比較物として用いた。
【００４６】試験例１
試作した各活性酸素消去用組成物（試料１～１７）及び各抽出組成物（比較試料１～３）の活性酸素消去能を次に述べる方法により評価した。すなわち、水を溶媒とし、活性酸素種として２重量％過酸化水素水１ｍｌ、ラジカル受容種として飽和炭酸水素カリウム１ｍｌ、及び活性酸素ラジカル消去物として１重量％の本発明の活性酸素消去用組成物又は比較対象物１ｍｌをマイクロプレートタイプのウエル型ホール中で混合して測定用サンプルとした。該サンプルは調製後ただちに、化学反応にともない生じる微弱な化学発光によるフォトン（光子）を高感度で検出することができるフォトンカウンティングカメラ（ＶＩＭカメラ）、イメージプロセッサー、データ解析装置及びモニターディスプレー装置を搭載した発光測定装置（浜松ホトニクス（株）製、ＡＲＧＵＳ－５０／ＶＩＭシステム）に供し、発光強度を１０分間蓄積測定した。この結果を表１～３に示す。同表において、発光強度は単位発光面積（１μｍ２）あたりのフォトン比例数である。なお、測定時の温度は室温とした。
【００４７】試料１～５－２及び比較試料１、２の活性酸素消去能を表１に、試料６～１４及び比較試料３の活性酸素消去能を表２に、また、試料１５～１８の活性酸素消去能を表３にそれぞれ示す。
【００４８】
【表１】

表1　活性酸素消去能

例	試料 No.	原料	発光強度（／μm²）
実施例	1	ケール	639
	2	キャベツ	236
	3	ブロッコリー（全体）	357
	4	大根（葉）	140
	5－1	ハボタン白色	265
	5－2	ハボタン紫色	507
比較例	比較1	トマト（実）	24
	比較2	シソ（葉）	8

【0049】なお、前記の測定系において測定されるフォトン比例数は、活性酸素が活性酸素消去物質と化学反応して安定化する際に生じる発光の強さを示すものであるから、該発光強度は活性酸素を消去する活性の強さに比例するものであることが知られている（前出の文献、安本教傳ら編「21世紀の栄養・食糧科学を展望する」、日本食品出版（株）、56～64頁、1999年など）。したがって、表1のデータから、本発明に係るアブラナ科植物の植物体の抽出物を含んでなる組成物は、発光強度が大きく、活性酸素を消去する能力に優れていることが明らかになった。とりわけ、アブラナ科植物としてケール、ハボタン、ブロッコリー等の抽出物では顕著な効果を奏することが認められた。

【0050】

【表2】

表2　活性酸素消去能

例	試料 No.	抽出条件	発光強度（／μm²）
実施例	6	50vol%メタノール，70℃	893
	7	70vol%メタノール，70℃	801
	8	水，50℃	1125
	9	水，70℃	2047
	10	水，95℃	1811
	11	水，加圧，125℃	750
	12	水，室温（2回）	1089
	13	10wt%酢酸，70℃	2569
	14	0.05wt%NaOH水溶液，70℃	772
比較例	比較3	青汁（市販品）	83

【0051】表2のデータから、ケールを乾燥させて切断したものを原料とし、望ましくは酸性の水又は含水親水性有機溶媒を用いて、50～100℃で抽出して得られる抽出物を含んでなる組成物は、活性酸素を消去する能力に優れていることが明らかになった。また、前記抽出物と緑茶エキス等の活性酸素消去能ある素材成分とを併用することにより所望の効果はより顕著に発現される。

【0052】

【表3】

表３　活性酸素消去能

例	試料 No.	精製処理	発光強度（／μm²）
実施例	１５	静置，沈殿物除去	2022
	１６	エタノール添加，沈殿物除去	2044
	１７	陰イオン交換カラム処理	5335
	１８	試料 10／緑茶エキス（8/2）	2150

【００５３】表３のデータから、本発明に係る抽出物に対し、沈殿物除去、陰イオン交換カラム処理等の精製処理を行うと、これにより得られる活性酸素消去用組成物は、発光強度がより一層高まることが明らかになった。

【００５４】

【発明の効果】本発明によれば、アブラナ科植物の植物体を水及び／又は親水性有機溶媒を用いて抽出して得られる抽出物を含有してなる活性酸素消去用組成物が提供される。ここで、アブラナ科植物としては特にケールを原料とし、また酸性の前記抽出溶媒を用いるとき、より顕著な活性酸素消去活性を有する活性酸素消去用組成物が得られる。さらに、前記抽出物と活性酸素消去活性のある公知の素材成分を併用すると、より一層顕著な活性酸素消去能を示す組成物となる。アブラナ科植物の植物体を原料として、望ましくは酸性の水及び／又は親水性有機溶媒を用いて５０～１００℃で抽出し、残渣を除去して得られる抽出液を好適にはアルコール分別して沈殿物を除去し、あるいはイオン交換処理に供した後に凍結乾燥もしくは噴霧乾燥等の粉末化処理をすることを特徴とする、前記効果を奏する活性酸素消去用組成物の製造方法が提供される。さらに、本発明によれば、前記活性酸素消去用組成物を配合してなる食用組成物を提供できる。この食用組成物は、経口摂取することにより体内の活性酸素消去や活性酸素に起因する各種疾患の予防用食品として利用され得るものである。

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[Detailed Description of the Invention]
[0001] [Field of the Invention] This invention relates to the constituent for active oxygen elimination which comes to use a specific raw material, manufacturing method, and utilization. It is related with the manufacturing method of this constituent, and utilization in more detail about the constituent for active oxygen elimination which comes to contain the extract extract by the water and/or the hydrophilic organic solvent of a plant body of the Brassicaceae vegetation.

[0002] [Description of the Prior Art] The energy of aerobic living things including Homo sapiens mainly needs the oxygen of a large quantity for the life support based on the oxidative phosphorylation in the living body. In the Homo sapiens adult, the oxygen of one day about 500 L is consumed for maintenance of everyday life. Although an oxygen demand changes remarkably with conditions of an organ, a cell, and a solid-state, several% of the oxygen incorporated in the living body is changing to the oxygen (henceforth active oxygen) always activated [radical / a superoxide anion, a hydrogen peroxide, a hydroxy radical, singlet oxygen, / alkoxy] by various enzyme metabolic systems. Many of those molecular species have high reactivity, and the active oxygen produced in the living body showed the germicidal action to the microorganism which trespasses upon the inside of the body, and has prevented the infection to a living body.

[0003] On the other hand, active oxygen attacks a lipid, protein, a nucleic acid, sugar, etc. in the living body, and carrying out the failure of the function is known. That is, it has the danger of making the reaction product which carries out the failure of the living body function increasing, and making the symptoms of various diseases showing, and worsening symptoms by radical chain reaction. For example, a destructive operation of deactivation of an enzyme, generation of peroxylipid, DNA chain scission, erythrocyte membrane, mitochondrial membrane, etc. takes place, and myocardial infarction, arteriosclerosis, cancer, diabetes mellitus, a liver failure, cerebral apoplexy, a cataract, stiffness in shoulder, oversensitivity to cold, a stain, a freckle, a wrinkling, etc. arise according to those operations.

[0004] Therefore, it is important for life support to carry out decomposition processing of the active oxygen generated in a metabolic turnover in the living body efficiently. Usually, the living thing has the antioxidation defense system which protects self from active oxygen with enzymes, such as superoxide dismutase, a catalase, and glutathione peroxidase, in the living body. However, if those amounts of enzymes decrease by stress, aging, etc., active oxygen will be accumulated superfluously, balance in the living body will collapse by this, and the above symptoms will be developed [the symptoms of them] or worsened. Then, in order to eliminate the generated superfluous active oxygen, it is safe and it necessary to supply food without a side effect, and the matter with the active oxygen elimination function included in a food raw material.

[0005] Retrieval of the matter with the operation which eliminates active oxygen has been performed from the former. For example, although there is superoxide dismutase generated even in the living body, this is protein, and in an ingestion, it is not digested or is not [injection administration also has the low survivability in blood, and]

suitable [this] for practical use. Moreover, although the so-called anti-oxidants, such as an ascorbic acid (vitamin C) and a tocopherol (vitamin E), are used from the point of antioxidizing, in respect of an active oxygen elimination function, effectiveness is all small, and there is a difficulty also in respect of stability. In addition, the active oxygen elimination component extracted from the natural product division crude drug raw material is proposed, for example, each official report, such as JP,61-24522,A, JP,2-193930,A, JP,2-264727,A, JP,3-153629,A, JP,4-69343,A, and JP,4-202138,A, has invention of a publication. However, these cannot fully be satisfied from the point of the effectiveness which eliminates active oxygen, and were not practical.

[0006] It is known that components, such as flavonoid, tannin, a catechin, and polyphenol, are generally contained in the vegetation which are a natural product, and these have the function which eliminates active oxygen. For example, polyphenol is contained in the extract extracted from a grape seed using water or a hydrophilic organic solvent, many anthocyanidins, pro anthocyanidins, etc. are especially contained, and it is marketed as a food raw material with active oxygen elimination ability or antioxidation ability. Moreover, when the operation whose flavonoid and catechin eliminate active oxygen under existence of an acetaldehyde, a hydrogen peroxide, etc. is shown, a feeble luminous phenomenon is accepted, and the attempt which is going to look for the component which has active oxygen elimination ability from this functionality, or a raw material occurs (Y. Yoshiki et al., Phytochemistry, 39,225-229 (1995), said J.Biolumin.Chemilumin., 10,335-338 (1995), etc.). Thus, although development of the raw material which has active oxygen elimination ability was considered wholeheartedly, even if it applied these to the product of the commercial base, it could not say actually that desired effectiveness was what may fully be discovered, but what eliminates active oxygen more powerfully and effectively was called for.

[0007] [Problem(s) to be Solved by the Invention] it aimed at inflict oxidation-breakage and injury on a living body DNA, a cell, an organization, etc., being able to eliminate or remove powerfully and effectively the active oxygen consider to cause the shape of aging, and various diseases, offer the constituent for active oxygen elimination without concern, and its manufacturing method at the point of safety by this invention, in view of this actual condition, and offer the edible constituent which blended this constituent further.

[0008] [Means for Solving the Problem] The constituent for active oxygen elimination of said technical problem is attained by the constituent for active oxygen elimination which comes to contain the extract of the plant body of the Brassicaceae vegetation. One sort or two sorts or more of things chosen from the group which consists of a kale, HABOTAN, broccoli, and a cauliflower as Brassicaceae vegetation here are desirable, among these especially a kale is desirable. Moreover, as for the extract concerning this invention, it is desirable that it is the powdered extract obtained by carrying out extract processing of the Brassicaceae vegetation using water and/or a hydrophilic organic solvent, and, as for the aforementioned extracting solvent, what presents acidity is still more desirable. In addition, 0-100 degrees C of temperature at the time of an extract are 50-100 degrees C more preferably. Furthermore, as for the extract concerning this invention, what presented processing of precipitate separation, an ion exchange column, etc., refined, and was refined especially through anion-exchange processing is much more desirable.

[0009] The constituent for active oxygen elimination of this invention is attained by the constituent for active oxygen elimination which comes at least to contain the extract of the plant body of the aforementioned Brassicaceae vegetation, and the well-known raw material which has active oxygen elimination ability again. Here, it is desirable that it is at least one sort chosen from the group which consists of an ascorbic acid (vitamin C), a tocopherol (vitamin E), catechins, anthocyanins, flavonoids, polyphenol other than these, a green tea extract, a roasted tea extract, and a rooibos tea extract as a well-known raw material which has active oxygen elimination ability.

[0010] The manufacturing method of the constituent for active oxygen elimination of said technical problem extracts what raw made as [what / the plant body] or dry the plant body of the Brassicaceae vegetation, and was cut in the shape of a chip at 0-100 degrees C using water and/or a hydrophilic organic solvent, and is attained by the approach of removing a solvent from this extract. Here, the Brassicaceae vegetation is a kale and it is desirable to use the cutting object of this dry matter as a raw material. Moreover, the solvent of an extract is made into acidity and it is desirable for temperature to be 50-100 degrees C, and for extract time amount to be 0.5 - 50 hours. Furthermore, as a manufacturing method of the constituent for active oxygen elimination which does more remarkable effectiveness so, it is attained to the extract obtained according to the above-mentioned manufacturing method purification processing of precipitate separation, ion exchange treatment, etc., and by performing anion-exchange processing more desirably.

[0011] Furthermore, the edible constituent of said technical problem is attained by the edible constituent which comes to blend one of the above-mentioned constituents for active oxygen elimination.

[0012] [Embodiment of the Invention] First, the constituent for active oxygen elimination of this invention is explained further in full detail below. The constituent for active oxygen elimination of this invention comes to contain the extract of the plant body of the Brassicaceae vegetation.

[0013] the Brassicaceae vegetation used as a raw material -- as an example -- a kale (Brassicaoleracea Var.acephala) (a chitin kale --) A tree kale, a bush kale, a MARO kale, a collard, green leaf Canarium album, etc., HABOTAN, broccoli, a cauliflower, rape, Chinese cabbage, a cabbage, MEKYABETSU (KOMOCHI Canarium album), Chinese cabbage, boy choy, a cress, A kohlrabi, watercress (watercress), TAASAI, a turnip, a Japanese radish, It is desirable to use one sort chosen from the group which can raise a Japanese horseradish, KYOUNA, garden KURESU, a rocket, mustard, shepherd's purse, HATAZAO, KONRONSOU, etc., and consists of a kale, HABOTAN, broccoli, and a cauliflower among these, or two sorts or more. The most desirable thing is a kale. Although especially the part of the plant body to be used is not limited, its parts with which it usually presents edible, such as a leaf, are desirable. In addition, although a raw material gestalt may be used in the raw state, what was dried more preferably is cut and used for moderate magnitude.

[0014] The extract concerning the constituent for active oxygen elimination of this invention can be obtained as follows. namely, said raw material -- receiving -- twice [

3 - 15 weight] as many water and/or a hydrophilic organic solvent as this -- adding -- the temperature of 0-100 degrees C -- more -- desirable -- 50-100 degrees C -- 0.5 - 50 hours, and 1 time -- or it extracts repeatedly. Subsequently, a ** exception and centrifugal separation remove extract residue, an extract is obtained, concentration processing is performed under reduced pressure if needed, and the extract of the shape of powder which removed moisture and was further excellent in active oxygen elimination ability with processing of spray drying or freeze drying is prepared. As a hydrophilic organic solvent, although a methanol, ethanol, propanol, a butanol, an acetone, an acetonitrile, an acetic acid, a formic acid, etc. can be used, if these are used in the high-concentration state, the active oxygen elimination ability of the extract obtained will fall, for example. Therefore, the water of the aforementioned hydrophilic organic solvent is carried out, and, in the case of a methanol or ethanol, in the case of the water content more than 30 capacity %, and other solvents, it is desirable to make it the water content more than 50 capacity %. Moreover, if what was more preferably set to pH 6-2 less than seven acid condition, i.e., pH, is used, using a hydrochloric acid, a phosphoric acid, an acetic acid, etc. as a solvent for ****, active oxygen elimination ability can obtain a higher extract. In addition, in removing a solvent from an extract, to heat, the extract component concerning this invention is comparatively stable, and is not limited to freeze-drying processing. However, it is desirable for lowering of the effectiveness of a request of this invention by deterioration by moisture absorption or oxidation to take place, and to lessen contact frequency with air as much as possible.

[0015] Although the extract which forms the subject of the constituent for active oxygen elimination of this invention is extracted and obtained from the plant body of the Brassicaceae vegetation as mentioned above, it can raise the active oxygen elimination ability of an extract further by dissolving this in water etc. and performing purification processing of the fractionation by adsorbents, such as centrifugal separation, ethanol precipitate separation, a solvent and judgment, silica gel, an alumina, activated carbon, and activated clay, ion exchange separation, etc. It is good to present ion exchange treatment with solutions, such as a water solution, nothing, and this, and to especially refine the extract obtained by said approach. Adsorption-and-desorption processing can be carried out using the resin which has anion-exchange ability desirably as ion exchange treatment, and the high component of active oxygen elimination ability can be condensed.

[0016] The constituent for active oxygen elimination of this invention makes the extract obtained as mentioned above contain, and is prepared. That is, it can be made to be able to mix or dissolve with various additives, such as a well-known raw material component which can make said extract itself the specified substance of this invention, or does not check the operation effectiveness of a request of this invention, an excipient, an extending agent, and flavors, and can also make with the shape of liquid and a paste, powder, granularity, or the solid constituent for active oxygen elimination. In this case, although the blending ratio of coal of the extract concerning this invention is arbitrary and a gestalt of a constituent, the raw material used together, the class of component, etc. made into the active oxygen elimination activity of an extract and the object are hard to prescribe uniformly, it is 30 - 90 % of the weight more preferably 0.1 to 99% of the weight in general from the point of the convenience in respect of utilization.

[0017] A thing desirable as an aforementioned concomitant use raw material or an aforementioned component is a well-known raw material which has active oxygen elimination ability. As this example, an ascorbic acid (vitamin C), a tocopherol (vitamin E), catechins (epigallocatechin, epigallocatechin gallate, and epicatechin --) ANTOSHININ (delphinidin and cyanidin --), such as epicatechin gallate flavonoids (a quercetin --), such as PECHUNIJIN, a peonidin, malvidins, and these glycosides At least one sort of things chosen from the group which consists of polyphenol other than [, such as rutin, kaempferol, luteolin, isoflavone, and these glycosides,] this (a saponin, ellagic acid, tannin, etc.), a green tea extract, a roasted tea extract, a rooibos tea extract, etc. are desirable.

[0018] It is simple to use the approach described below for evaluating the active oxygen elimination ability of the constituent for active oxygen elimination which comes to contain the extract concerning this invention and this. Namely, it sets in the system with which three kinds of matter of reactive oxygen species, the active oxygen radical elimination matter, and an active oxygen radical acceptance kind coexists. The approach (refer to the aforementioned reference) of detecting the feeble luminous phenomenon produced in case reactive oxygen species and the active oxygen radical elimination matter react chemically and active oxygen is stable as photon reinforcement, There is ESR spin trapping using active oxygen and DMPO(s) (5 and 5-dimethyl-1-pyrroline-N-oxide), such as super oxide and a hydroxy radical, forming DMPO-O2 adduct under oxidase coexistence etc.

[0019] Although the constituent for active oxygen elimination containing the extract of the plant body of the Brassicaceae vegetation is offered as mentioned above in this invention, the constituent which comes to blend this further is also offered. As a mode of this constituent, an edible constituent, the constituent for remedies, the constituent for makeup, other industrial use constituents, etc. can be illustrated. An edible constituent is [among these] suitable. Although the example of said class product is shown below, this invention is not limited to these.

[0020] As an edible constituent, the constituent for active oxygen elimination of this invention as it is A liquid, Gel or solid food, for example, a soft drink, juice, tea, a dressing, The source, bean paste, soy sauce, soup, jelly, a pudding, yogurt, chocolate, fish flour, gum, a candy, a cake mix, and snack confectionery -- the dairy products of the shape of powdered or a liquid -- It can add on a pan, Cookie, etc. or can be suitably processed into powder, granulation, a tablet, oral administration liquid, etc. with excipients, such as starch, a dextrin, and a lactose, coloring matter, perfume, etc., or a fabricating operation is carried out to a capsule using covering material, such as gelatin, and it can use as health food, a supplement, or quasi drugs.

[0021] In this edible constituent, although it is hard to specify the loadings of the constituent for active oxygen elimination of this invention according to a class, a condition, etc. of the edible constituent concerned uniformly, they are 1 - 30 % of the weight more preferably 0.1 to 50% of the weight in general. At less than 0.1 % of the weight, if the effectiveness of a request according [loadings] to an ingestion is small and exceeds 50 % of the weight, flavor will be spoiled depending on the class of edible constituent, or there is a case where it becomes impossible to prepare the edible constituent concerned. In addition, even if it presents edible by making this into an

edible constituent as it is in itself [of this invention / constituent] for active oxygen elimination, it does not interfere.

[0022] In addition to said edible constituent, it can be powdered or liquid, and the constituent for active oxygen elimination of this invention can be blended with sun screen products, such as a cream, a milky lotion, a lip stick, foundation, and sunscreen liquid, a shampoo, a rinse, etc., and can be made with the constituent for makeup, and it blends with various packing products, a sealing compound, adhesives, a paint agent, etc., and may be used also as an industrial use constituent.

[0023] [Example] After having cut example 1 student's kale in the shape of a chip, adding twice [5 weight] as many water as this to this and carrying out extract processing at 95 degrees C for 1 hour, residue was carried out the ** exception and the extract was obtained. Subsequently, the extract of the shape of powder of a yellowish brown color - brown was prepared by carrying out freeze-drying processing of this. This extract was used as the constituent for active oxygen elimination of this invention (sample 1).

[0024] Example 2 student's cabbage was processed like the example 1, and the constituent for active oxygen elimination of this invention (sample 2) was prepared.

[0025] Example 3 student's broccoli (whole) was processed like the example 1, and the constituent for active oxygen elimination of this invention (sample 3) was prepared.

[0026] The leaf of example 4 student's Japanese radish was processed like the example 1, and the constituent for active oxygen elimination of this invention (sample 4) was prepared.

[0027] What of HABOTAN of an example 5 student condition is white or purple was processed like the example 1, and the constituent for active oxygen elimination of this invention (a sample 5-1 or sample 5-2) was prepared.

[0028] After having used as the raw material what was made to dry example 6 student's kale and was cut in the shape of a chip (henceforth the desiccation chip of a kale), adding the water ethanol of twice [10 weight] as many alcoholic concentration:50 capacity % as this to this and carrying out extract processing at 70 degrees C for 1 hour, residue was carried out the ** exception and the extract was obtained. Subsequently, it hardened by drying under reduced pressure of this and the extract of the shape of powder of ****** - brown was prepared. This extract was used as the constituent for active oxygen elimination of this invention (sample 6).

[0029] The water methanol of twice [12 weight] as many alcoholic concentration:70 capacity % as this was added to the desiccation chip of example 7 kale, after making it return for 1 hour and carrying out extract processing at 65 degrees C, residue was carried out the ** exception and the extract was obtained. Subsequently, it hardened by drying under reduced pressure of this and the extract of the shape of powder of greenish-brown - brown was prepared. This extract was used as the constituent for active oxygen elimination of this invention (sample 7).

[0030] After adding twice [12 weight] as many water as this to the desiccation chip of example 8 kale and carrying out extract processing at 50 degrees C for 1 hour, residue was carried out the ** exception and the extract was obtained. Subsequently, the extract of the shape of powder of a yellowish brown color - brown was prepared by carrying out freeze-drying processing of this. This extract was used as the constituent for active oxygen elimination of this invention (sample 8).

[0031] After adding twice [14 weight] as many water as this to the desiccation chip of example 9 kale and carrying out extract processing at 70 degrees C for 1 hour, residue was carried out the ** exception and the extract was obtained. Subsequently, freeze-drying processing of this was carried out, and the extract of the shape of powder of a yellowish brown color - brown was prepared. This extract was used as the constituent for active oxygen elimination of this invention (sample 9).

[0032] After adding twice [13 weight] as many water as this to the desiccation chip of example 10 kale and carrying out extract processing at 95 degrees C for 3 hours, residue was carried out the ** exception and the extract was obtained. Subsequently, freeze-drying processing of this was carried out, and the extract of the shape of powder of a yellowish brown color - brown was prepared. This extract was used as the constituent for active oxygen elimination of this invention (sample 10).

[0033] After having taught the desiccation chip of a kale to the example 11 pressure-resistance container, adding twice [12 weight] as many water as this to this chip and carrying out extract processing at 125 degrees C under about 2kg/cm2 application of pressure for 1 hour, residue was carried out the ** exception and the extract was obtained. Subsequently, freeze-drying processing of this was carried out, and the extract of the shape of powder of a yellowish brown color - brown was prepared. This extract was used as the constituent for active oxygen elimination of this invention (sample 11).

[0034] After adding twice [12 weight] as many water as this to the desiccation chip of example 12 kale and carrying out extract processing at a room temperature for 15 hours, residue was carried out the ** exception and the extract was obtained. this residue -- twice [7 weight] as many water as this -- adding -- the same -- a room temperature -- a 15-hour extract -- the occasion -- the ****** exception was performed and the extract was obtained. The extract of the shape of powder of a yellowish brown color - brown was prepared by freeze-drying in accordance with both extracts. This extract was used as the constituent for active oxygen elimination of this invention (sample 12).

[0035] After adding the twice [12 weight] as many 10-% of the weight acetic-acid water solution as this to the desiccation chip of example 13 kale and carrying out extract processing at 70 degrees C for 1 hour, residue was carried out the ** exception and the extract was obtained. Subsequently, it hardened by drying under reduced pressure of this and the extract of the shape of powder of greenish-brown - brown was prepared. This extract was used as the constituent for active oxygen elimination of this invention (sample 13).

[0036] After adding the twice [12 weight] as many 0.05-% of the weight sodium-

hydroxide water solution as this to the desiccation chip of example 14 kale and carrying out extract processing at 70 degrees C for 1 hour, residue was carried out the ** exception and the extract was obtained. Subsequently, it hardened by drying under reduced pressure of this and the extract of the shape of powder of greenish-brown - brown was prepared. This extract was used as the constituent for active oxygen elimination of this invention (sample 14).

[0037] Example 15 sample 10 was dissolved in water so that the concentration might become 40 % of the weight, at the room temperature, after about 3-hour standing, centrifugal separation of the produced precipitate was carried out, it was removed, and supernatant liquor was extracted. Subsequently, the powder-like purification extract was prepared by freeze-drying this. This purification object was used as the constituent for active oxygen elimination of this invention (sample 15).

[0038] The purification extract of the shape of powder acquired in the example 16 example 15 was dissolved in water so that the concentration might become 20 % of the weight, after adding ethanol so that alcoholic concentration may become 50 % of the weight at this, centrifugal separation of the produced precipitate was carried out, it was removed, and supernatant liquor was extracted. Subsequently, the powder-like purification extract was prepared by freeze-drying this. This purification object was used as the constituent for active oxygen elimination of this invention (sample 16).

[0039] Example 17 sample 10 was dissolved in water so that the concentration might become 10 % of the weight, and it poured into open column tubing filled up with the anion exchange resin (Bio-Rad, AG1-X8) which made it beforehand activated with a conventional method, and passed at 1ml a rate for /by making water into a mobile phase. This actuation was continued for 30 minutes, the mobile phase was changed with the acetic-acid water solution 6% of the weight, and the adsorption component was made to elute. The powder-like purification extract was prepared by carrying out freeze-drying processing of this acetic-acid part fraction. This purification object was used as the constituent for active oxygen elimination of this invention (sample 17).

[0040] Extract processing of the green tea leaf of example 18 marketing was carried out with 80-degree C hot water for 1 hour, residue was separated, and the green tea extract was obtained. Subsequently, spray drying processing of this was carried out, and the green tea extract of the shape of powder of greenish yellow brown was built. This green tea extract and the powder-like extract prepared by the approach of a publication in the example 10 were fully mixed at a rate of 20:80 (weight ratio), and it considered as the constituent for active oxygen of this invention (sample 18).

[0041] the desiccation after spraying a reduction maltose starch syrup (maltitol) water solution on 1kg (sample 9) of constituents for powdered active oxygen elimination of example 19 this invention 15% of the weight, presenting a high-speed agitation granulation machine (FUKAEPAU lek company make, high speed mixer) and granulation-izing -- and screening (10 - 80 Tyler mesh) was carried out, and the granularity edible constituent was made as an experiment. This does not have grassy smell peculiar to greenstuff, and flavor and mouthfeel are good, and eliminate active oxygen in the living body, and it may be suitably used as food for prevention of the various diseases induced by operation of active oxygen.

[0042] It added for 0.2l. of commercial coarse tea, 2g (sample 10) of constituents for powdered active oxygen elimination of example 20 this invention was fully mixed, and the homogeneous drink object was made as an experiment. This thing does not have inferiority in food fitness, such as flavor, tone, and mouthfeel, as compared with usual coarse tea, and may be used as a drink for prevention of the various diseases related to active oxygen elimination and this.

[0043] The fruit of example of comparison 1 student's tomato was crushed lightly, this was made into the raw material, it processed like the example 1, and the powder-like extract constituent (comparison sample 1) was obtained.

[0044] The leaf of example of comparison 2 student's beefsteak plant was cut in the shape of a chip, this was made into the raw material, it processed like the example 1, and the powder-like extract constituent (comparison sample 2) was obtained.

[0045] The green soup (the product made from Tanabe Food, desiccation powder article) of marketing which used example of comparison 3 kale as the raw material was used as a comparison object of this invention article.

[0046] The approach of describing below the active oxygen elimination ability of each constituent for active oxygen elimination (samples 1-17) made as an experiment example of trial 1 and each extract constituent (comparison samples 1-3) estimated. namely, water -- a solvent -- carrying out -- as reactive oxygen species -- as 1ml of 2-% of the weight hydrogen peroxide solution, and a radical acceptance kind -- as 1ml of saturation potassium hydrogencarbonates, and an active oxygen radical elimination object -- the constituent for active oxygen elimination or 1ml of comparison objects of 1% of the weight of this invention -- a microplate type well -- it mixed all over the mold hole and considered as the sample for measurement. After preparation, immediately, the luminescence measuring device (the Hamamatsu Photonics make, ARGUS-50 / VIM system) carrying the photon counting camera (VIM camera) and image processor which can detect the photon (photon) by the feeble chemiluminescence produced in connection with a chemical reaction by high sensitivity, data analysis equipment, and a monitor display unit was presented with this sample, and it carried out are recording measurement of the luminescence reinforcement for 10 minutes. This result is shown in tables 1-3. In this table, luminescence reinforcement is the number of photon proportion of per unit luminescence area (1micrometer2). In addition, temperature at the time of measurement was made into the room temperature.

[0047] The active oxygen elimination ability of samples 6-14 and the comparison sample 3 is shown in a table 2, and the active oxygen elimination ability of samples 15-18 is shown for the active oxygen elimination ability of a sample one to 5-2, and the comparison samples 1 and 2 in a table 1 at a table 3, respectively.

[0048] [A table 1]

表１　活性酸素消去能

例	試料 No.	原料	発光強度（／μm²）
実施例	1	ケール	639
	2	キャベツ	236
	3	ブロッコリー（全体）	357
	4	大根（葉）	140
	5－1	ハボタン白色	265
	5－2	ハボタン紫色	507
比較例	比較1	トマト（実）	24
	比較2	シソ（葉）	8

[0049] In addition, the number of photon proportion measured in the aforementioned system of measurement Since the strength of luminescence produced in case active oxygen reacts chemically with the active oxygen elimination matter and is stable is shown It is known that this luminescence reinforcement is a thing proportional to the strength of the activity which eliminates active oxygen (Japanese Food Publication [volumes / above-mentioned reference and on Yasumoto **** / "the nutrition and food science in the 21st century will be viewed"], 56-64 pages, 1999, etc.). Therefore, the constituent which comes to contain the extract of the plant body of the Brassicaceae vegetation concerning this invention from the data of a table 1 had large luminescence reinforcement, and excelling in the capacity which eliminates active oxygen became clear. With extracts, such as a kale, HABOTAN, and broccoli, having done remarkable effectiveness so was especially admitted as Brassicaceae vegetation.

[0050] [A table 2]

表２　活性酸素消去能

例	試料 No.	抽出条件	発光強度（／μm²）
実施例	6	50vol%エタノール，70℃	893
	7	70vol%メタノール，70℃	801
	8	水，50℃	1128
	9	水，70℃	2047
	10	水，95℃	1811
	11	水，加圧，125℃	750
	12	水，室温（2回）	1089
	13	10wt%酢酸，70℃	2569
	14	0.05wt%NaOH水溶液，70℃	772
比較例	比較3	青汁（市販品）	83

[0051] It became clear that the constituent which comes to contain the extract which

uses as a raw material what was made to dry a kale and was cut from the data of a table 2, and is extracted and obtained at 50-100 degrees C using acid desirable water or an acid desirable water hydrophilic-property organic solvent is excellent in the capacity which eliminates active oxygen. moreover, active oxygen ******, such as said extract, green tea extract, etc., -- desired effectiveness is more notably discovered by using together a certain raw material component.

[0052] [A table 3]

表３　活性酸素消去能

例	試料 No.	精製処理	発光強度（／μm²）
実施例	１５	静置，沈殿物除去	2022
	１６	エタノール添加，沈殿物除去	2044
	１７	陰イオン交換カラム処理	5335
	１８	試料 10／緑茶エキス（8/2）	2150

[0053] When purification processing of precipitate clearance, anion-exchange column processing, etc. was performed from the data of a table 3 to the extract concerning this invention, as for the constituent for active oxygen elimination obtained by this, it became clear that luminescence reinforcement increases further.

[0054] [Effect of the Invention] According to this invention, the constituent for active oxygen elimination which comes to contain the extract which extracts the plant body of the Brassicaceae vegetation using water and/or a hydrophilic organic solvent, and is obtained is offered. Here, when using a kale as a raw material especially as Brassicaceae vegetation and using said acid extracting solvent, the constituent for active oxygen elimination which has more remarkable active oxygen elimination activity is obtained. Furthermore, if a well-known raw material component with said extract and active oxygen elimination activity is used together, it will become the constituent in which much more remarkable active oxygen elimination ability is shown. after extract at 50-100 degrees C using acid desirable water and/or an acid desirable hydrophilic organic solvent , carry out alcoholic judgment of the extract which remove residue and be obtain suitably by use the plant body of the Brassicaceae vegetation as a raw material , and remove precipitate or present ion exchange treatment , the manufacture approach of the constituent for active oxygen elimination which do said effectiveness so characterize by carry out disintegration processing of freeze drying or spray drying be offer . Furthermore, according to this invention, the edible constituent which comes to blend said constituent for active oxygen elimination can be offered. This edible constituent may be used by carrying out an ingestion as food for prevention of the various diseases resulting from active oxygen elimination in the living body and active oxygen.

CLAIMS

[Claim 1] The constituent for active oxygen elimination which comes to contain the extract of the plant body of the Brassicaceae vegetation.

[Claim 2] The constituent for active oxygen elimination according to claim 1 which is

one sort chosen from the group which the Brassicaceae vegetation becomes from a kale, HABOTAN, broccoli, and a cauliflower, or two sorts or more.

[Claim 3] The constituent for active oxygen elimination according to claim 1 which is the powdered extract with which an extract carries out extract processing and is obtained using water and/or a hydrophilic organic solvent.

[Claim 4] The constituent for active oxygen elimination according to claim 3 water and/or whose hydrophilic organic solvent are acid things.

[Claim 5] The constituent for active oxygen elimination according to claim 1 or 3 with which an extract is refined through ion exchange treatment.

[Claim 6] The constituent for active oxygen elimination which comes at least to contain the extract of the plant body of the Brassicaceae vegetation, and the well-known raw material which has active oxygen elimination ability.

[Claim 7] The constituent for active oxygen elimination according to claim 6 which is at least one sort chosen from the group which the well-known raw material which has active oxygen elimination ability becomes from an ascorbic acid, a tocopherol, catechins, anthocyanins, flavonoids, polyphenol other than this, a green tea extract, a roasted tea extract, and a rooibos tea extract.

[Claim 8] The manufacturing method of the constituent for active oxygen elimination characterized by extracting the plant body of the Brassicaceae vegetation at 0-100 degrees C using water and/or a hydrophilic organic solvent.

[Claim 9] The manufacturing method of the constituent for active oxygen elimination according to claim 8 characterized by extracting the cutting object of the dry matter of a kale using acid water and/or an acid hydrophilic organic solvent, and presenting ion exchange treatment with this extract.

[Claim 10] The edible constituent which comes to blend the constituent for active oxygen elimination of a publication with any 1 term of claims 1-7.